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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/782,640

02/19/2004

Karl Joseph Bois

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4114

22879 7590 10/09/2007  
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INTELLECTUAL PROPERTY ADMINISTRATION  
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EXAMINER

DINH, TUAN T

ART UNIT

PAPER NUMBER

2841

MAIL DATE

DELIVERY MODE

10/09/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/782,640	BOIS ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Tuan T. Dinh	2841	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 10 July 2007.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,4,8,16,19,20 and 26-35 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,4,8,16,19,20,26,28-31 and 33-35 is/are rejected.
- 7) ☒ Claim(s) 27 and 32 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input checked="" type="checkbox"/> Other: <u>An attaching paper.</u>                |

### DETAILED ACTION

Noted of the claimed language:

The term "loss tangent", which is defined as a dissipation factor (see attaching paper).

#### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, 4, 8, 16, 19-20, 26, 28, 31, 33 are rejected under 35 U.S.C. 102(b) as being anticipated by Pommer (U.S. Patent 5,839,188).

As to claims 1, 4, 16, 19, 26, 28, 31, 33, Pommer discloses a printed circuit board (PCB) substrate and its method (10) as shown in figures 1-3, comprising:

first and second dielectric materials (dielectric layers 22, 32, these layer made by polyimide) associated with first and second current return layers (24, 34);

a signal path layer (26; 36) interposed between said first dielectric material and said second dielectric material; and

an adhesive layer (40) interposed between said first and second dielectric materials, said adhesive layer (40) being substantially coplanar relative to said signal

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path layer (26; 36), said adhesive layer (40) comprises dielectric material selected from the group consisting of a two-sided adhesive tape, an epoxy adhesive sheet that contains a glass based adhesive (44, column 8, line 11), having a lower loss tangent than said first dielectric material and has a higher glass transition point than said first dielectric material, see column 7, line 57 through column 8, line 54), note: the adhesive containing a glass particles within such that the loss tangent is lower than the resin (dielectric layer), said adhesive layer comprising a material (glass, polymer, silica having a dielectric constant (DK) about 1.5-3, see column 8, lines 9-23) operable to substantially reduce attenuation due to an electrical flux coupling effect between a pair of signal traces disposed in said signal path layer.

As to claim 8, Pommer discloses said first dielectric material (22) comprises a material selected from the group consisting of PR-4 material, pre-preg material core material, and B-stage substrate material, see columns 7-8.

As to claim 20, Pommer further comprising curing a layer of said PCB substrate, said layer selected from the group consisting of said first dielectric material said second dielectric material, and said adhesive layer.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 29-30 and 34-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pommer in view of Fischer et al. (U.S. Patent 6,344,371).

Regarding claims 29-30, and 34-35, Pommer discloses all of the limitations of the claimed invention, except for the adhesive layer made by ePTPE having loss tangent of about 0.0036. Fischer et al. teaches a multilayer as shown in figures 1-10 comprising an adhesive filler made by ePTPE and having a loss tangent about 0.0036.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have a teaching of Fischer applied in the PCB of Pommer in order to provide a high density package.

#### ***Allowable Subject Matter***

5. Claims 27, 32 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

#### ***Response to Arguments***

6. Applicant's arguments filed 07/10/07 have been fully considered but they are not persuasive.

Applicant argues:

Pommer does not disclose "the adhesive layer having a lower loss tangent than the dielectric material." Examiner disagrees because the composition of the adhesive containing particles that including glass having DK within a range of 1.5 to 3, which is

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less than the polyimide of the dielectric layer having DK in the range of 3.1-4.1, see the attaching paper, and the dielectric layer is made by polyimide. Therefore, the adhesive layer having a lower loss tangent than said first dielectric material.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tuan T. Dinh whose telephone number is 571-272-1929. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Reichard Dean can be reached on 571-272-1984. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Tuan Dinh  
September 27, 2007.



TUAN T. DINH  
PRIMARY EXAMINER

9/27/07.

### DIELECTRIC CONSTANT, LOSS TANGENT AND TEMPERATURE RANGE OF TYPICAL RADOME MATERIALS

For reference only  
Please perform your own testing as properties may vary with  
processing methods and manufacturers.

*Dissipation factor*

#### Reinforced Thermoset Materials

Material	Dielectric Constant	Loss Tangent	Temperature Range
Polyester / "E" Fiberglass	4.3	.016	180°F
Epoxy / "E" Fiberglass	4.2	.015	300°F
Epoxy / Quartz	3.5	.015	300°F
Cyanate Ester / Quartz	3.3	.003	400°F
Bismaleimide / Quartz	3.3	.003	475°F
Polyimide / "E" Fiberglass	3.1	.004	550°F
Polyimide / Quartz	3.1	.003	550°F

#### Unfilled Thermoplastic

Material	Dielectric Constant	Loss Tangent	Temperature Range
PEEK	3.5	.004	340°F
PPO	2.6	.0007	230°F
PEI	3.1	.002	390°F
PES	3.0	.001	340°F
ABS	2.8	.01	200°F
PTFE	2.0	.0002	250°F
HDPE	2.3	.0003	160°F
Polycarbonate	3.1	.010	260°F
Polystyrene	2.5	.0004	150°F

#### Rain Erosion Coatings

Material	Dielectric Constant	Loss Tangent	Temperature Range
Polyurethane Rain Erosion	3.75	.06	250°F
Fluoroelastomer Rain Erosion	3.0	.04	400°F

## NURAD

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A Chelton Group Company

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